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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,974	08/06/2001	Theodore M. Bloomstein	101328-0159	1442

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EXAMINER

SAGAR, KRIPA

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 07/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/922,974

Applicant(s)

BLOOMSTEIN ET AL.

Examiner

Kripa Sagar

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 21 October 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 10/21/02 has been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: References to figure 1 have not been indicated in the text; p.22;l.18 ff and p.28 l.13ff.

Appropriate correction is required.

Double Patenting

3. Claim 19 of this application conflicts with claim12 of Application No. 09922973. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the step "*further* comprising: depositing a *first* layer of *photoresist* on a substrate;" . Claim 13 depends from claim 1 wherein first and second layers of *resist* are already deposited. The process steps appear to be repeated. It is not evident from the specification that the Applicant intends to use two different polymers (resists and photoresists) in a repeated sequence.

Clarification is sought on the process steps.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6,10,12-18 are rejected under 35 U.S.C. 102(b) as being anticipated by US Pat. 5182056 to Spence et al.

The claims recite a method of patterning a multilayer resist. The layers are coated and exposed in sequence wherein the exposure dose of the second layer is modulated according to the region on the layer. The claims recite using negative tone resists (cl. 10); varying the dose with fluence (cl.12); using photoresists (cl.13); forming

multiple layers (cl.14) and varying the exposure doses on each layer (cl.15) according to the light leakage from the overlying layer (cl.16). Claim 17 recites vector scanning.

Spence teaches a stereolithographic method which comprises forming a *first resist layer*, exposing the layer to form gelled and un-gelled portions; coating a *second layer of resist* and exposing it to form second gelled and un-gelled portions (9;64-10;22). It teaches *varying the dose* to control the exposure in overlapping areas (Fig.26 & 15;18-45). The exposure dose is controlled by the *intensity* and the scan time which is equivalent to the *number of pulses* (38;19-33). The exposure dose may be controlled by the modulation of *laser power or fluence* (41; 60 - 42;12). The process may be repeated to build a 3-dimensional part (1;5-56;6). Spence teaches using negative tone resists (cl.10) wherein the exposed areas are gelled or polymerized (1;39-41); varying the dose by varying the power (cl.12) or fluence (41; 60 - 42;12); using (cl.13) photoresists (23;24-45); forming multiple layers (1;5-56;6) and varying the dose on each layer (15;18-45) according to the *light leakage* from the overlying layer (fig.26). The interior portions of fig.26 receive a greater dose than the perimeter regions due to the penetration depth of the beam and multiple exposures (figs.2-6). Spence teaches (cl.17) vector scanning (40;11-18). Spence teaches all the elements of claim 18 as shown herein.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 7-9,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spence as applied to claim 1 in view of the non-patent publication of Gale et al. (Opt.Engg. 1994) and further in view of admitted prior art.

The claims recite developing the exposed resist layers (cl.7) heating the resist layers(cl.8); using positive and negative tone resists (cl.9); using novolac resist (cl.11).

The teachings of Spence have been discussed above.

Spence does not teach using a positive tone resist (cl.11,9), heating the resist (cl.8) or developing the resist layers after exposure (cl.7).

Gale teaches using a positive tone resist (p.3557; #2.1). The resist is baked (p.3558; #2.2). The resist is developed after exposure (fig.2). These are conventional lithographic steps.

Gale uses a commercially available positive tone resist; it is not apparent that it is a DNQ/novolac based resist. However this is a well-known class of conventional resist as admitted by Applicant (p.7; l. 1-5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use positive tone DNQ-novolac resists and bake and develop the exposed resists as taught by Gale (and as known in admitted prior art) because Gale teaches that three dimensional resist structures can be successfully formed using the conventional lithographic methods.

Conclusion

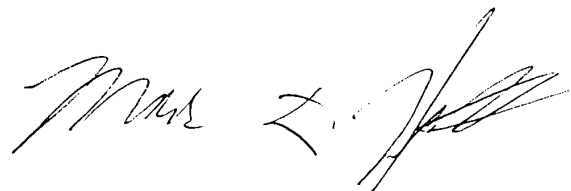
9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Non-Patent publication of Chen et al. (1996) teaches most of the elements of the instant claims.

10. Advances in stereolithography have been steadily made since the first patent to Hull in 1986. Most of the problems recited and the solutions proposed by the Applicant have been recited in the earlier published references cited here and a significant volume of other publications. However Examiner has not encountered the step of modifying the interface between the resist layers in the publications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kripa Sagar whose telephone number is 703-605-4427. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



MH/ks
July 2, 2003

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700